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# Risk Perceptions and Food Safety Enhancing Technologies – Does Information Matter?

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# Cornhusker Economics

## Risk Perceptions and Food Safety Enhancing Technologies – Does Information Matter?

Market Report	Year Ago	4 Wks Ago	2-19-16
<b>Livestock and Products,</b>			
<b>Weekly Average</b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .	163.12	132.37	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .	269.97	193.45	197.68
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .	212.01	158.35	159.35
Choice Boxed Beef, 600-750 lb. Carcass. . . . .	238.69	234.67	213.84
Western Corn Belt Base Hog Price Carcass, Negotiated. . . . .	56.51	52.58	63.19
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean. . . . .	72.05	71.69	75.70
Slaughter Lambs, woolled and shorn, 135-165 lb. National. . . . .	*	135.97	134.54
National Carcass Lamb Cutout FOB. . . . .	365.03	354.18	344.46
<b>Crops,</b>			
<b>Daily Spot Prices</b>			
Wheat, No. 1, H.W.			
Imperial, bu. . . . .	5.13	3.94	3.79
Corn, No. 2, Yellow			
Nebraska City, bu. . . . .	3.69	3.41	3.46
Soybeans, No. 1, Yellow			
Nebraska City, bu. . . . .	9.55	8.35	8.33
Grain Sorghum, No.2, Yellow			
Dorchester, cwt. . . . .	7.18	5.59	5.62
Oats, No. 2, Heavy			
Minneapolis, Mn, bu. . . . .	3.11	2.54	2.47
<b>Feed</b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185			
Northeast Nebraska, ton. . . . .	195.00	*	170.00
Alfalfa, Large Rounds, Good			
Platte Valley, ton. . . . .	75.00	82.50	82.50
Grass Hay, Large Rounds, Good			
Nebraska, ton. . . . .	82.50	85.00	85.00
Dried Distillers Grains, 10% Moisture			
Nebraska Average. . . . .	178.75	135.50	131.50
Wet Distillers Grains, 65-70% Moisture			
Nebraska Average. . . . .	57.50	52.00	52.00
* No Market			

The recent cases of human *E. coli* infections linked to Chipotle Mexican Grill in mid-October to November of 2015 brought the issue of food safety into the limelight. The outbreaks which were first detected in the Seattle Washington and Portland Oregon areas, were also reported in 7 other states, altogether leaving about 50 persons infected. Following a report about the outbreak by the Centers for Disease Control, Chipotle's sales for the last quarter of 2015 plunged by nearly 15% (Bloomberg News, Jan 6, 2016), adding to other costs incurred due to the outbreak such as medical expenses of the individuals infected and productivity losses. Without doubt, news from the media that raises awareness about compromises in food products reverberates among consumers. Consumer attitudes and responses towards food safety issues are influenced by their implicit biases, unique predispositions, and their perceptions of food safety risks. News about food safety compromises in the media, and other information sources may amplify such consumer predispositions.

A study was conducted by Agricultural Economists at the University of Nebraska-Lincoln to investigate the role of the nature, source and framing of information on consumers' food safety risk perceptions, as well as their attitudes towards technologies that are shown to be effective in reducing food safety risks. More specifically, a survey instrument was developed to ex-

amine the influence of information provision on consumer risk perceptions of *E. coli* O157 infections through beef consumption, as well as the perceived safety of meat products from cattle vaccinated against *E. coli* O157 and fed direct-fed microbials. Vaccines against *E. coli* and the use of direct-fed microbials have been approved for use by the United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA), respectively, and have been reported to reduce the incidence of *E. coli* bacteria in cattle by 80% (Hurd and Malladi 2012) and 50%, respectively (Brashears 2012). In addition, Matthews et al. (2013) find that vaccines are effective in reducing human cases of *E. coli* by as much as 85%.

To investigate whether media stories on food safety issues impact consumers' risk perceptions, the study included a story published in the New York Times in its October 3, 2009 edition, reporting the case of a young dance instructor who suffered a severe form of an *E. coli* infection that left her paralyzed, after consuming an *E. coli* contaminated hamburger. Exploring the role of information further, Kahneman and Tversky's (1979) prospect theory findings suggest that individuals place greater weight and are more sensitive to losses than to gains of the same magnitude were tested by providing both loss-framed and gain-framed information to study participants. The gain-framed information narrated that consumers could significantly reduce their risk of an *E. coli* O157 infection (by as much as 80%) if they consumed beef products from cattle treated with these two interventions, while the loss-framed information narrated the opportunity forgone in reducing this risk, if they instead consumed beef products from untreated cattle.

The survey was fielded in July and August of 2015 and produced a random, representative of the US population sample of 1,879 individuals across the US. The experimental design randomly assigned survey participants into one of six information treatment groups. Respondents in the first information group, which served as the control, received only general information about *E. coli* and the two technologies. Respondents in the second and third information groups, in addition to general information, received gain-framed and loss-framed information, respectively. Respondents in the fourth information group received general information along with the media story

while those in the fifth and sixth information groups received general information, the media story as well as the gain-framed and loss-framed information, respectively. Thus, each information group was exposed to different information as they completed the survey.

Empirical findings reveal a rather interesting set of consumer response behaviors towards the new technologies, and food safety risks in general across the different information groups. Respondents who received only the media story about the plight of the young woman reported being more concerned about becoming ill from an *E. coli* infection when they consumed hamburgers, relative to the control group. However, exposure to the media story did not increase consumer perceptions of the likelihood of getting infected by *E. coli* when consuming hamburgers as compared to the control in our sample. Although respondents in both media story and control groups perceived their likelihood of an *E. coli* infection as moderate when qualitative scales were used, their responses differed when asked to quantify this risk in terms of the number of hamburgers they believed would make a person ill from an *E. coli* infection. The group exposed to the media story were more likely to associate the likelihood of getting ill from such bacteria with the quantity of hamburgers consumed when compared to the control group, a difference that was statistically significant.

Study findings also affirmed the persuasive influence of both loss-framed and gain-framed messages, though loss-framed messages had a stronger persuasive impact than gain-framed messages. For instance, relative to the control group, participants in the loss-framed group were 12.7 percentage points more likely to rate beef products from cattle vaccinated against *E. coli* as safe, while respondents who received the gain-framed information were 9.8 percentage points more likely to rate these products as very safe; a difference that was statistically significant. The safety rating of beef products from cattle fed direct-fed microbials were comparable for both loss-framed and gain-framed message groups, but respondents in the loss-framed group were more likely, albeit marginally, to rate such beef products as very safe. Also, participants in the loss-framed group were the least likely to rate beef products from cattle not treated with either inter-

ventions as very safe, compared to the control group. Notably, the combined loss-framed message and the media story had an impact on safety ratings for beef products from cattle vaccinated against *E. coli*, and from cattle given no intervention, supporting findings in the literature that show that issue involvement (captured by the media story in our study) influences the effectiveness of message framings (Maheswaran and Meyers-Levy 1990; Ganzach, Weber and Or 1997)

Overall, these findings validate Kahneman and Tversky's prospect theory and the strong persuasive influence of loss-framed messages. It is important to note that our study findings also show that respondents who place high trust in institutions like the FDA or scientists in universities as sources of accurate food safety information were more likely to rate as very safe meat products from cattle treated with the above interventions. This finding highlights the role trusted sources of information play in influencing attitudes towards food safety interventions. The study results should be useful to policy makers who may mandate or regulate the use of these food safety enhancing technologies and agents in the beef sector who influence the variety and presentation of consumption choices available to consumers.

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